vel involutae, pubescentes vel pilosae, 1–6 cm longae, 1–2 mm latae; paniculae 2–12 cm longae, ca. 0.5 cm latae, exsertae vel parte inferiore inclusa, ramis 0.5–4 cm longis, appressis, ad basim floriferis; spiculae 3.5–4.5 mm longae; glumae 1.5–3 mm longae, abrupte acutae vel acuminatae, aristatae; lemma 3–5 nervium, nervis lateralibus scabris vel ciliatis, callo pubescente; arista 10–30 mm longa, gracilis, flexuosa; palea acuminata lemma aequans.

Annual; culms 10–25 cm long, leafy, erect to decumbent, sometimes rooting at the lower nodes, slender to filiform, freely branching, glabrous to scabrous below the nodes, angular, usually square in cross section; sheaths commonly longer than the internodes, striate, more or less pilose at the throat, the margins often ciliate; ligule thin, erose to ciliate, about 0.5 mm long; blades flat to involute, divergent, pubescent to sparsely pilose, 1–6 cm long, 1–2 mm wide; panicles numerous, very narrow, exserted or more often included at the base, 2–12 cm. long, about 0.5 cm wide, the branches 0.5–4 cm long, appressed, floriferous from the base or nearly so; spikelets narrow, terete, 3.5–4.5 mm long; glumes equal or unequal, 1.5–2 mm or sometimes 3 mm long, prominently 1-nerved, scabrous on the nerve, abruptly acute or acuminate, commonly aristate, the awn usually about one-half the entire length; lemma prominently 3-nerved, with usually 2 intermediate nerves, scabrous to prominently ciliate on the lateral nerves, the callus appressed pubescent; awn 10–30 mm long, slender, flexuous; palea long-acuminate, as long as or slightly longer than the lemma.

This species is related to *M. ciliata* (H.B.K.) Kunth, which differs in having spreading panicle branches and shorter lemmas (2–2.5 mm long), shorter awns (3–12 mm long). It is also closely allied to *M. tenella* (H.B.K.) Trin., which differs in having smaller spikelets (2–2.5 mm long).

Type.—*Pringle 1745* (U. S. National Herbarium no. 995478), moist ledges of the barranca near Guadalajara, Jalisco, Mexico, November 1, 1888.

Range.—Moist rocky hillsides of southern Arizona, south to Jalisco, Mexico.

Specimens examined.—ARIZONA: Mule Mountains, Cochise County, *L. N. Goodding M-348, L. N. & C. Goodding M-406;* Sycamore Canyon, Santa Cruz County, *L. N. Goodding M-318, M-375, A-9386.* SONORA: Canyon de Huépari, north of Aribabi, *Harvey 1742.* CHIHUAHUA: Batopilas, *Palmer* in 1885. DURANGO: Vicinity of Durango, *Palmer 719* in 1896. JALISCO: Chapala, *Holway 3479;* Guadalajara, *Palmer 404* and *481* in 1886; Tequila, *Pringle 5395;* Zapotlan, *Hitchcock 7257.*

PALEOBOTANY.—Pinus *and* Quercus *in the Chesapeake Miocene.*[1]

EDWARD W. BERRY, Johns Hopkins University.

In 1936 I described a pine cone from the Calvert Cliffs Miocene under the name of *Pinus collinsi*,[2] naming it after the collector. Obviously the specimen furnished few features for a specific diagnosis, or for useful comparisons with other described species, either recent or fossil. I remarked on the apparent scarcity of land plants in these shallow-water marine sediments. In the past few years detailed examination of these strata by Dr. R. E. Lee Collins and by Dr. Charles T.

[1] Received June 30, 1940.

[2] Torreya **36**: 125, fig. 2. 1936.

Berry has demonstrated that remains of land plants, although uncommon as might be expected, are not nearly so rare as had been assumed, and incidentally, the same remark might be made of land animals. It is the purpose of the present note to comment on some additional occurrences.

Pinus collinsi Berry

These cones are in the same poor state of preservation and with the same lack of specific characters as the type. Sometimes they are fairly complete. At others they are badly broken up, or not much more than the macerated cone axis is preserved. Superficially they all appear to belong to the single species, but this is incapable of proof.

To date they have been collected from the following localities and horizons: 1.7 miles south of Plumpoint, Zone 11 of Calvert formation (type); 1½ miles south of Plumpoint, Zone 10 of Calvert formation; ¼ and ½ mile north of Governors Run, Zone 14 of the Calvert formation; 2 miles south of Cove Point, Calvert County, St. Marys formation. The foregoing are all in Maryland. In addition, similar cones have been found near the south end of Stratford Cliffs (Nomini), Westmoreland County, Va., in the Calvert formation.

At the locality 1½ miles south of Plumpoint, the cones are associated with driftwood of *Pinus* and fragments of dicotyledonous leaves. Figs. 1 and 2 show the usual condition of these cones. The lignite to which they have been altered is structureless, and if not treated before drying with gum arabic, paraffin, or duco they disintegrate very rapidly.

Quercus sp.

Several acorns of some species of oak were collected in 1937 at Stratford Cliffs, 1 mile below the mouth of Popes Creek, Westmoreland County, Va., by Charles T. Berry. They are about 1.5 cm in length by 1 cm in diameter and afford no diagnostic features.

The following species of oaks, based upon leaves, were described in 1916 from near shore phases of the Calvert formation at Richmond, Va., and from two localities in the District of Columbia near Washington[3]: *Quercus calvertonensis*, *Quercus chapmanifolia*, and *Quercus lehmani*. The first was compared with the modern *Quercus alba*, the second with *Quercus chapmani*, and the third with *Quercus emoryi*. If any conclusion can be drawn from these most similar living relatives, which is perhaps doubtful, the Miocene *Quercus chapmanifolia* and *Quercus lehmani* should have had acorns smaller than the present fossil. It would seem that *Quercus calvertonensis*, though a smaller-leafed form than the existing *Quercus alba*, was the only one of the Miocene species based on leaves with which the fossil acorn should be correlated, although this is, of course, problematical.

The known Miocene flora of the middle Atlantic slope is one of cypress

[3] Berry, Edward W., U. S. Geol. Surv. Prof. Paper 98: 61–73, pls. 11, 12. 1916.

swamps, sand dunes, and beach ridges. Whether these ecological groups are merely the normal reflection of the coastal zone in shallow marine sediments or whether they are of wider climatic significance can not be determined from present information. That there was less runoff from the land, or at least less terriginous material in the water, thus permitting the accumulation of the diatomaceous beds that are so prominent a feature of the earlier Miocene sediments in this region, is certainly well established.

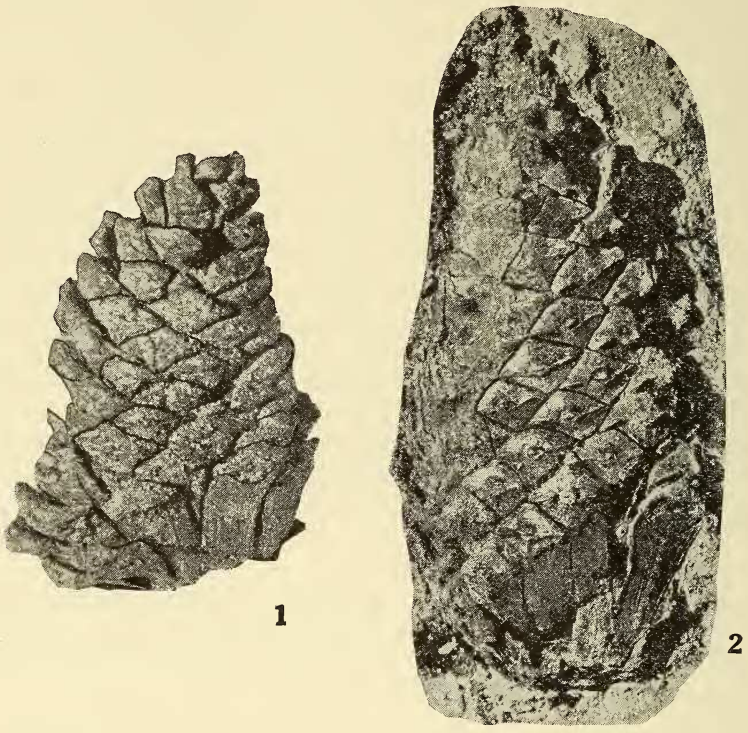

Fig. 1.—*Pinus collinsi* Berry, from 1½ miles south of Plumpoint, Md.
Fig. 2.—*P. collinsi* from south end of Stratford Cliffs, Va.

The known flora appears, as judged by present-day conditions, to be about normal to the latitude. There is considerable evidence from the little that is known about the Tertiary floras of the eastern United States that the Miocene climate was somewhat cooler than that of the Eocene, and there is overwhelming evidence in the fossil floras of other parts of the world, notably in the Mississippi embayment, northern Europe, and the Arctic, that this was a world-wide condition. There is also considerable evidence that the contemporaneous marine fauna of the Calvert is a cooler-water fauna than those of the earlier Tertiary and also, although to a lesser degree, than those of the later Tertiary.